UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/554,700	10/27/2005	Helmuth Holler	P70873US0	9652

136 7590 02/03/2009

JACOBSON HOLMAN PLLC
400 SEVENTH STREET N.W.
SUITE 600
WASHINGTON, DC 20004

EXAMINER	
MA, JAMESON Q	

ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
02/03/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/554,700	HOLLER ET AL.	
	Examiner	Art Unit	
	JAMESON Q. MA	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-4, 6, and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Admission of Prior Art (see P3/L12-P4/L12 of instant specification) in view of Hirota et al. (US 3,664,965).

Regarding claim 1, the Applicant's Admission of Prior Art (AAPA) discloses a method for leak-testing a component having cavities (P3/L12-14), comprising, on at least one side of the component to be tested, completely wetting with a testing liquid at least an area to be tested (P3/L14-16), subjecting the component to a temperature increase, (P3/L16) checking the component test area for a bubble formation of the testing liquid (see P3/L16-20).

While the AAPA disclose that water is used as a testing liquid and that the leaks are detected by observing of bubble formation (P3/L14-20), the reference does not explicitly disclose the testing liquid being foam-forming.

Hirota '965 teaches a method of detecting gas leaks by using of a foaming liquid such as soapy water to a vessel (C1/L21-23).

The AAPA and Hirota '965 are analogous because both references are directed to detecting leaks by checking for bubble formation.

It would have been obvious to one of ordinary skill in the art at the time of invention to substitute the testing liquid used in the AAPA with soapy water taught by

Hirota '965, because doing so would have made the bubbles formed in the method used in the AAPA last longer and remain visible for longer periods of time to the test operator, therefore making the detection of leaks easier and more accurate.

Regarding claims 2-4, 6, and 7-8, modified AAPA discloses all of the claim limitations as set forth above. Additionally, modified AAPA discloses:

- a testing method, wherein at least the component area to be tested is cooled before being wetted with the testing liquid (see P4/L3-12: when the component is removed from the heated bath, it is naturally cooled before subsequent immersions are performed).
- a testing method, wherein the cooling is effected to -30°C at the most (see P4/L3-12: it is inherent that the cooling is effected to -30°C at the most because if cooling were effected to temperature lower than -30°C, the testing liquid (water) would be in solid form).
- a testing method, wherein at least the component test area is heated after having been wetted with the testing liquid (P3/L15-16).
- a testing method, wherein opposed portions of the component area to be tested are wetted with the testing liquid (P3/L19-21: leaks are detected by observing bubbles rising in the liquid container, it is inherent that the entire component is submerged in order to determine if a leak is present on the entire structure)
- a testing method, wherein sites exhibiting bubble formation are marked (P3/L21-23).

Regarding claim 6, not specifically taught is a method, characterized in that the heating is effected to 80°C at the most. However, the routine experimental modification of this prior art done in order to ascertain the optimum properties of disclosed leak detection fails to render the applicant's claims patentable in the absence of unexpected results. See In re Aller, 105 USPQ 233 and MPEP 2144.05. At the time of invention a person having ordinary skill in the art would have found it obvious to optimize the temperature to which to heat the component in order to balance such properties as cost and possible damage to components due to heating at excessive temperatures. A prima facie case of obviousness may be rebutted, however, where the results of the optimizing variable, which is known to be result-effective, are unexpectedly good. See In re Boesch and Slaney, 205 USPQ 215.

3. Claims 1, 4 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tetsuo et al. (from IDS, JP 57054832) in view of Hirota et al. (US 3,664,965).

Regarding claim 1, Tetsuo discloses a method for leak-testing a component having cavities (test piece 4), comprising, on at least one side of the component to be tested, completely wetting with a testing liquid at least an area to be tested (see Abstract: the entire test piece is submerged in a fluid to test for leaks), subjecting the component to a temperature increase (see abstract), checking the component test area for a bubble formation of the testing liquid (see abstract).

While Tetsuo discloses the test piece covered by a testing liquid to detect leaks by bubble formation, the reference does not explicitly disclose the testing liquid being foam-forming.

Hirota '965 discloses applying a foam-forming composition to a structure (see C1/L13-20). Hirota '965 further discloses that the composition is externally applied to structures in leak detection testing, and that bubbles of sufficient durability are formed to cling to the point of origin, allowing inspection to occur a considerable time after testing (see C1/L49-54).

It would have been obvious to one of ordinary skill in the art at the time of invention to substitute for the testing liquid used in the method of Tetsuo, the foam-forming liquid as taught by Hirota '965, in order to allow leak origins to precisely defined and remain visible for extended time periods.

Regarding claims 4 and 7, modified Tetsuo discloses all of the claim limitations as set forth above. Additionally, Tetsuo discloses the method wherein at least the component test area is heated after having been wetted with the testing liquid (see Abstract). Tetsuo also teaches the method wherein opposed portions of the component area to be tested are wetted with the testing liquid (see Abstract: the entire test piece is wetted with the testing liquid).

Regarding claim 6, not specifically taught is a method, characterized in that the heating is effected to 80°C at the most. However, the routine experimental modification of this prior art done in order to ascertain the optimum properties of disclosed leak detection fails to render the applicant's claims patentable in the absence of unexpected results. See In re Aller, 105 USPQ 233 and MPEP 2144.05. At the time of invention a person having ordinary skill in the art would have found it obvious to optimize the temperature to which to heat the component in order to balance such properties as cost

and possible damage to components due to heating at excessive temperatures. A prima facie case of obviousness may be rebutted, however, where the results of the optimizing variable, which is known to be result-effective, are unexpectedly good. See In re Boesch and Slaney, 205 USPQ 215.

Regarding claims 8-10, modified Tetsuo discloses all of the claim limitations as set forth above. Additionally, Hirota '965 teaches the method:

- wherein sites exhibiting bubble formation are marked (see C3/L1-3).
- wherein the testing liquid is applied by brushing at least the component area to be tested (see C2/L65).
- wherein the testing liquid is applied by spraying at least the component area to be tested (see C2/L65).

4. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tetsuo et al. (from IDS, JP 57054832) in view of Hirota et al. (US 3,664,965) as applied to claims 1, 4 and 6-10 above, and further in view of Goldfarb et al. (US 4,553,435).

Regarding claims 5 and 14, modified Tetsuo discloses all of the claim limitations as set forth above. While modified Tetsuo discloses that the component (test piece) is heated by a heater, the reference does not explicitly disclose the method wherein the component is heated by irradiation or infrared irradiation.

Goldfarb teaches an infrared heating lamp (see fig. 1: infrared lamp 31) used to heat components.

It would have been obvious to one of ordinary skill in the art at the time of invention to substitute for the heater in the method of modified Tetsuo, an infrared heat

lamp as taught by Goldfarb, because doing so would have resulted in nothing more than the simple substitution of known heating elements to obtain predictable results.

5. Claims 11-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tetsuo et al. (from IDS, JP 57054832) in view of Hirota et al. (US 3,664,965) as applied to claims 1, 4 and 6-10 above, and further in view of Hirota et al. (4,113,673).

Regarding claims 11-13, modified Hirota '965, discloses all of the claim limitations as set forth above. Modified Hirota '965 does not explicitly disclose a method:

- further comprising after said testing, a step of removing the testing liquid by washing.
- wherein the washing process step is effected under pressure.
- characterized in that the washing process is mechanically assisted.
- wherein the washing step is mechanically assisted.

Hirota '673 discloses a method for leak-testing a component by applying a bubble forming substance to a test area (C5/L3-5). Hirota '673 further discloses removing the test liquid by washing with water at a pressure of $2kg/cm^2$ (C5/L65-67). In order to pressurize the water, this process must have inherently been mechanically assisted.

It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the washing methods of modified Hirota '965, as taught by Hirota '673, in order to prevent the test liquid from interfering with normal operation/use of the component.

Response to Arguments

6. Applicant's arguments filed 11/5/2008 have been fully considered but they are not persuasive. With respect to the obviousness rejection based on disclosed art (AAPA) and Hirota '965, the combination does teach the limitations of claims 1-4 and 6-8 and is thus maintained. The disclosed art teaches the step of covering a test area with a liquid to detect leaks and the step of heating the component while covered by the test liquid. Applicant's assertions that it would not have been obvious for a person skilled in the art developing gas pressure testing devices for large hull structures where the interior is accessible to consider heating the gas in order to raise the gas pressure level, and that such a process may not be feasible, as taught by Hirota '965 are noted. However, these assertions are moot because Hirota '965 is merely used as a teaching that soapy water (a foam-forming liquid) has been known to be used in leak testing applications. Applicants assertion that the method of the instant application provides a fast an reliable leakage test which overcomes the limitations and disadvantages of the prior art is immaterial to the patentability of the claims.

Regarding applicant's assertion that in the present application the components to be tested (honeycomb or sandwich-type composite materials), it is noted that these limitations are not recited in the claim language.

Regarding applicant's statement that applicant's invention provides a method wherein the liquid is applied on the area to be tested and that it is not analogous to the liquid basins shown in the prior art, the AAPA shows a method wherein a component to be tested is completely submerged by the testing liquid. Applicant's assertion that the

prior art methods do not allow for rapid and reliable identification of the flaws, and are much more time and energy consuming as compared to applicant's claimed method is moot because the prior art still reads on the claimed invention.

Regarding applicant's assertion that one of ordinary skill in the art would not consider using a foam-forming liquid for liquid basins deployed in the prior art detection of flaws due to uncontrolled formation of bubbles in a basin filled with foam-forming liquid, it is the examiner's position that the presence of a foam forming liquid would make the visualization of bubbles easier and that the formation of bubbles in the method would still be due to the bubbling at leak locations.

7. Applicant's arguments, see P16-19, filed 11/5/2008, with respect to the rejection(s) of claim(s) 1, 4, 5, 6, and 8-13 under 35 U.S.C. § 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Tetsuo (from IDS, JP 57054832), Hirota (US 3,664,965), Hirota (US 4,113,673), and Goldfarb (US 4,553,435). Tetsuo teaches a method for leak testing components by covering with a testing liquid and subjecting the component to a temperature increase to increase the internal pressure within the component. Hirota '965 teaches a foam-forming liquid that allows bubbles to be sustained for long periods at the point of origin. Hirota '673 teaches the steps of washing a foam-forming liquid after conducting leak testing and Goldfarb teaches an infrared heating device. The references are logically combined to meet applicant's claimed invention.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMESON Q. MA whose telephone number is (571)270-7063. The examiner can normally be reached on M-R 8:30 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Warden Jill can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JM

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1797

January 28, 2009